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US 5434395 A

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(54) Transferring data between smart cards and a network

(57) A smart card wallet 301 allows transfer of funds between a first smart card 302 and a second smart card 303 connected to a network, such as the Internet, via a personal computer 304. In response to programs implemented by the personal computer, it is possible to effect money transfers between the first smart card and a remote station, via the Internet. The wallet is capable of detecting the presence of an emulating device and in response to this detection transfer protocols are modified. In this way, it is possible to prevent transfers which exceed a predetermined amount or where the amount being transferred is inconsistent with information selected or displayed on the personal computer.

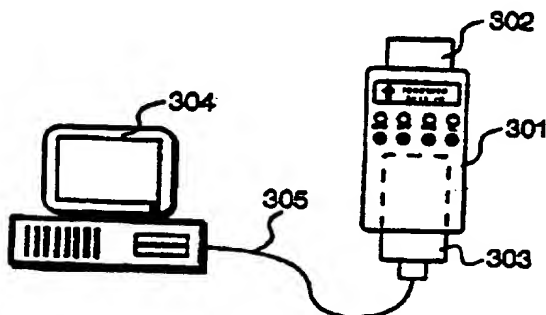


Figure 3

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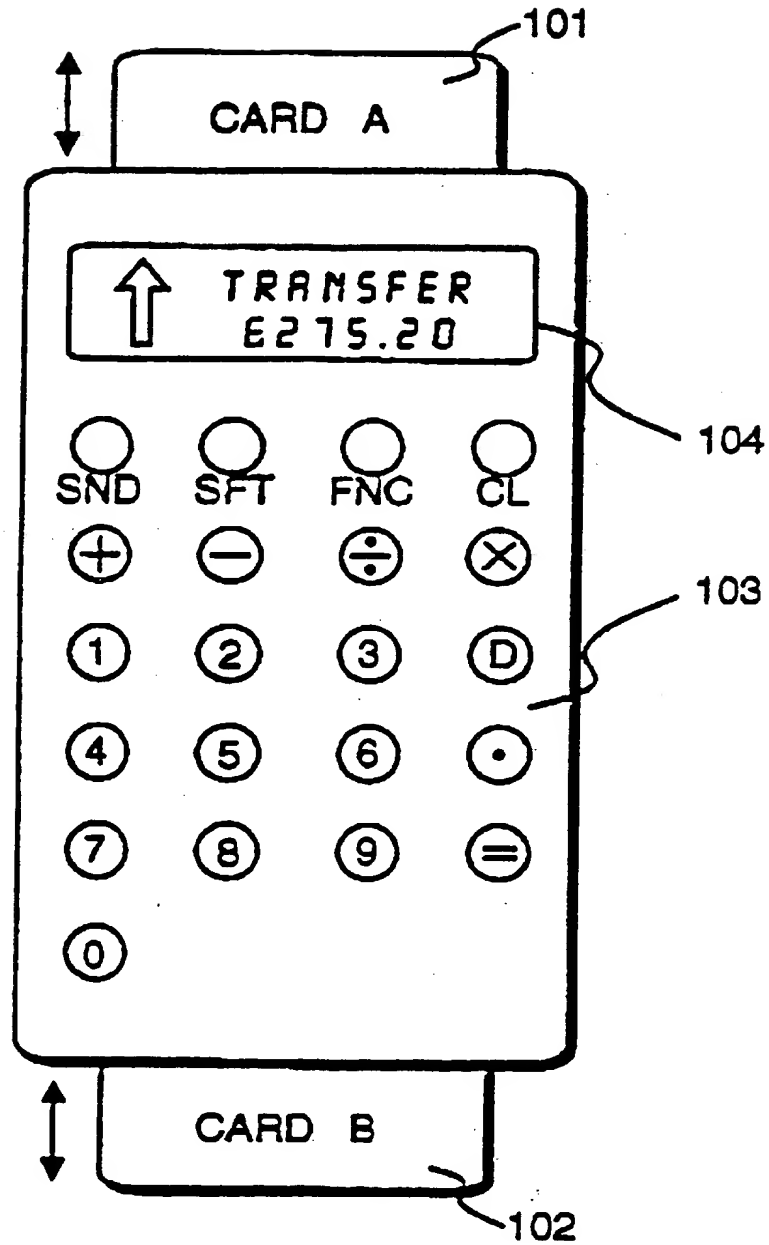


Figure 1

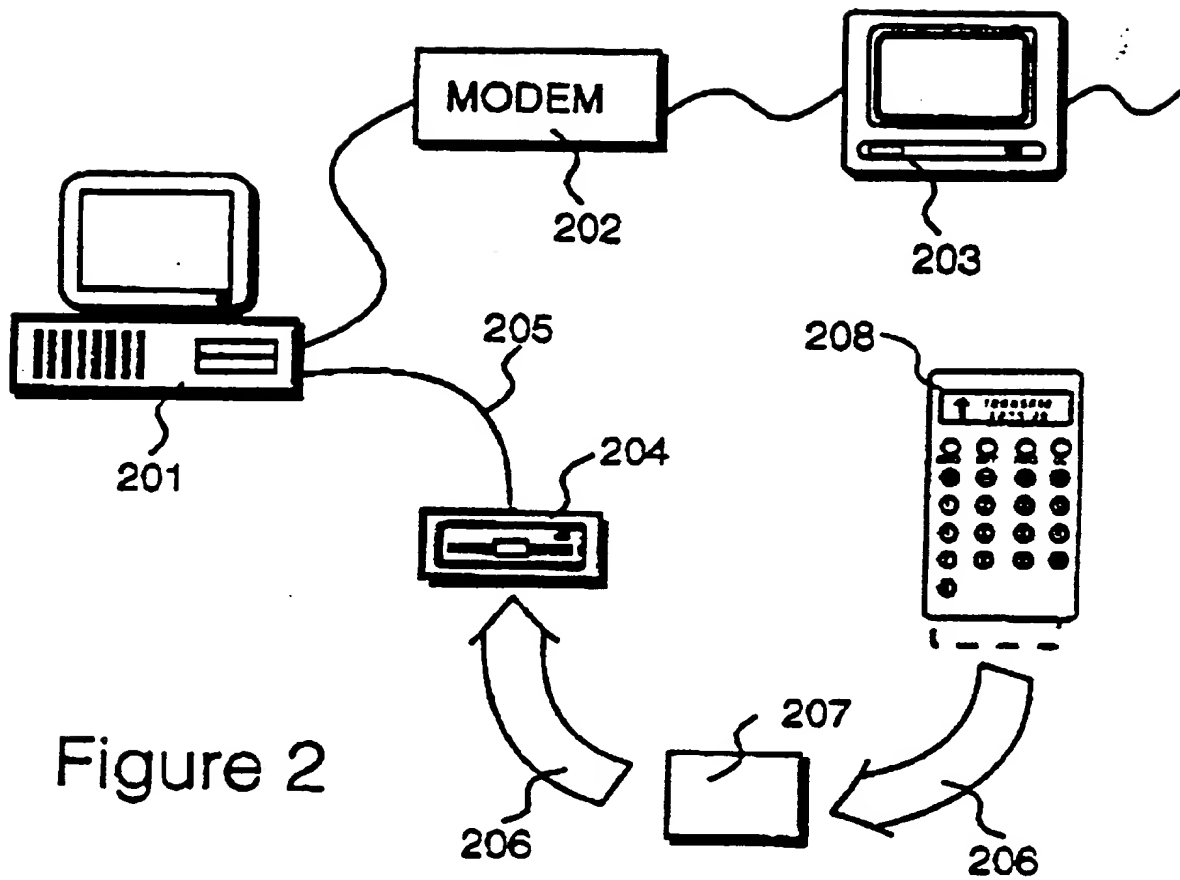


Figure 2

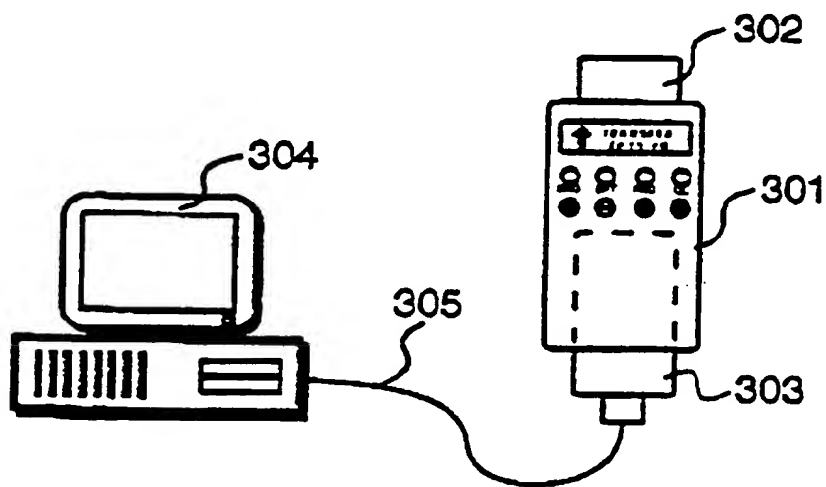


Figure 3

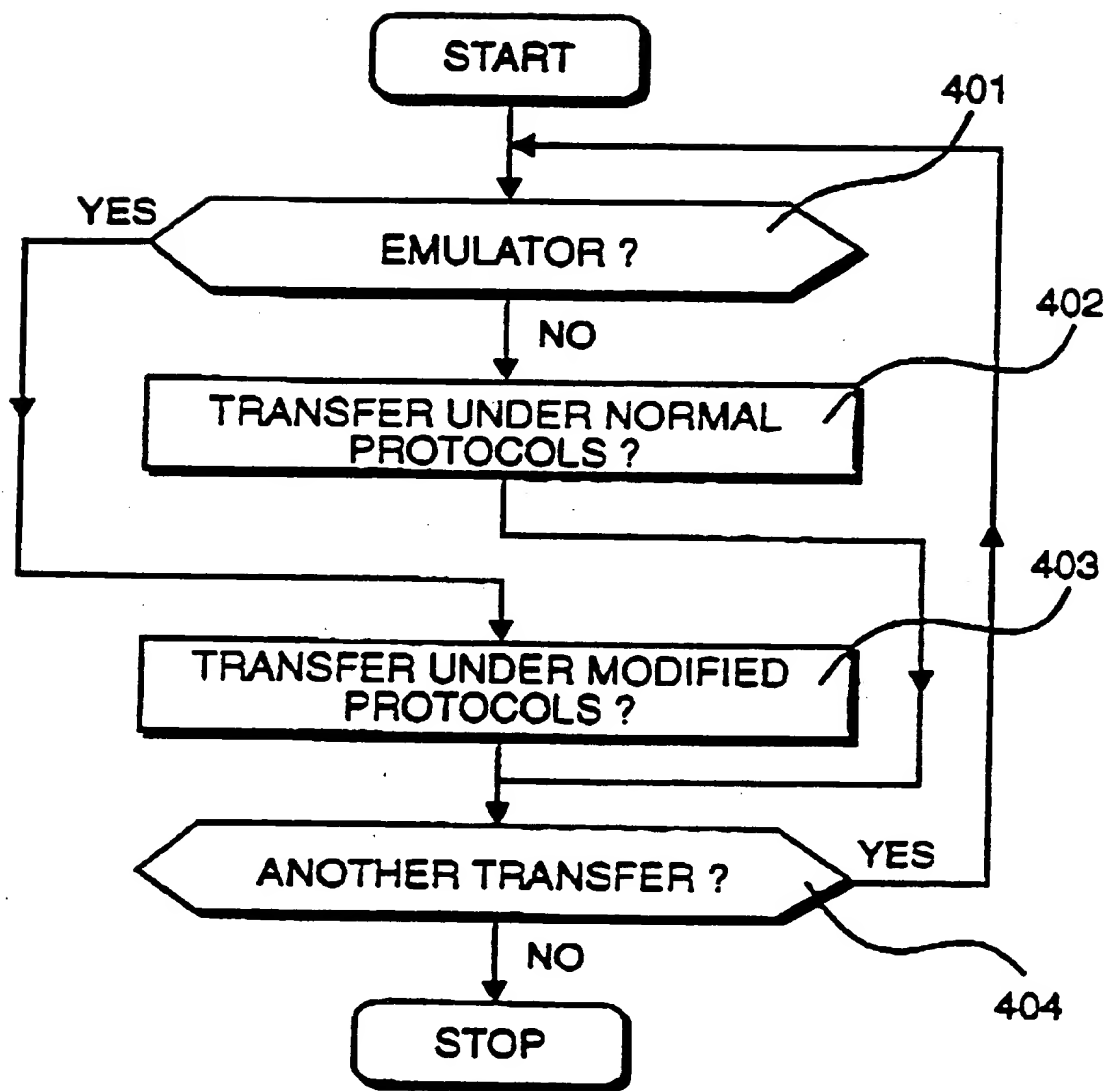


Figure 4

## TRANSFERRING DATA BETWEEN PORTABLE DATA STORAGE DEVICES AND A NETWORK

The present invention relates to an apparatus for transferring data and a method of transferring data between portable data storage devices and  
5 a network. First means are provided to couple with a first portable storage device and second coupling means are provided to couple with a second portable storage device.

A system for the exchange of data between portable data storage devices, such as smart cards used for storing money tokens, is described  
10 in GB patent publication number 2 282 683. In this system, an exchange commanding device is coupled to both of two portable data storage devices and is arranged to pass command data to them for initiating a data transfer. Once this command data has been passed, the portable data storage devices are directly connected and are then  
15 responsible for conducting the actual exchange of data themselves. Completion of the data transfer can be monitored by monitoring the state of a data line directly connecting the two data storage devices.

An advantage of this system is that it allows secure transfers of money tokens to be made in an environment where information  
20 provided to a customer is equivalent to that provided to a vendor and the sum of money tokens held on the two cards at all times remains constant. However, a disadvantage of this system is that it does not facilitate the remote transfer of funds via a network such as the Internet.

Fund transfers over networks are easily facilitated using single card read/write devices connected to a computer that is itself on-line via a network such as the Internet. A device of this type is manufactured by General Information Systems Ltd and sold under the trade mark "Smart Mouse". The device has a smart card reader/writer for connection to a processing environment, such as a PC personal computer, via an RS 232 serial interface. Alternatively, similar devices may be installed within disk drive slots of the personal computer.

It can be seen that devices such as the Smart Mouse described above does allow money transactions using smart cards to be effected over the Internet. However, there are at least two disadvantages to taking this approach. Firstly, users are required to make an additional investment in terms of obtaining a Smart Mouse or similar device. Users requiring devices of this type would very likely have their own transaction device, therefore they are required to make an additional investment in terms of buying an additional reader for making network transfers. In addition, there is a greater disadvantage to effecting operations of this type. Transactors of the type identified above, as described in the above British patent publication, are secure and are controlled, in response to instructions from read only memory, under the environments of the cards themselves or of the device processor itself. However, transactions using smart card readers for network communication rely on programs implemented by the network computer itself. Given the nature of systems such as the Internet, these programs are often supplied from vendors over the network such that customers then become reliant on the integrity of this down-loaded software. It is



therefore possible for software of this type to be created, arranged to display information of a first type whilst actually performing a transaction of a second type. Thus, it is possible for a customer to be informed that, for example, five units of currency are being deducted from a card while in actual fact 100 units of currency are being deducted. The customer has therefore lost the security of using a transaction device, thereby severely restricting the application of network transactions.

According to a first aspect of the present invention, there is provided apparatus for transferring data between portable data storage devices and a network, comprising

first coupling means arranged to couple with a first portable storage device;

second coupling means arranged to selectively couple with either a second portable storage device or an emulating device, wherein said emulating device is connected to said network via a processing system;

means for detecting the presence of either a second portable storage device or an emulating device connected to said second coupling means; and

means for modifying transfer operations if an emulating device is detected as being connected to said second coupling means.

An advantage of the present invention is that it allows a customer's existing transaction device to be used, in preference to an alternative card reader. The cost of an emulating device should be substantially less than that of a card reader thereby increasing sales of

such units and encouraging the use of network transactions. Furthermore, transaction devices themselves are modified for operation within a network environment and include means for detecting the presence of either a second portable storage device (for conventional operation), or for detecting the presence of an emulating device for use within a network environment. In this way, checks may be made while transactions are taking place, given that the transfer operations are modified when the emulating device is detected, such that, for example, a customer would be invited to sanction a particular transaction in response to being prompted to do so, before the actual transaction takes place. Thus, a customer would only sanction transaction of this type if the information displayed on the local computer screen is consistent with that displayed on the customer's transaction device.

The invention will now be described by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a portable hand held exchange communicating device having slots for receiving money cards;

Figure 2 shows an existing device for effecting money transfers over networks;

Figure 3 shows a transfer device of the type shown in Figure 1, embodying the present invention; and

Figure 4 illustrates operations of the device shown in Figure 3.

A portable hand held exchange commanding device is shown in Figure 1, arranged to receive a first smart card 101 and a second smart card 102. The device includes a keyboard 103 and a display device 104, providing a user interface to allow parties to insert their cards into the device and to specify an amount of financial token data to be exchanged between the smart cards along with the direction of the exchange. In addition, the device may also be used by the respective parties to the transactions for them to enter their personal identification numbers, as may be required in order to authorise a transaction between cards 101 and 102.

An existing device for effecting transactions over a network is illustrated in Figure 2. A personal computer, such as an IBM PC 201, provides communication over a network via a modem 202 and a telecommunications port 203, possibly connected to the public switched telephone network. Smart cards, carrying money tokens, are read and modified by a card reader/writer 204, connected to the PC 201 via a serial interface cable 205. As indicated by arrows 206, it is necessary for a smart card 207 to be removed from a conventional transaction device 208 and thereafter manually inserted within the card reader/writer 204. Thus, in the known system shown in figure 2, it is necessary for a user to purchase an additional card reader and, thereafter, for transactions to be effected exclusively under the control of instructions executed by the computer 201.

A system embodying the present invention is shown in Figure 3. Transactor 301 is substantially similar to the device shown in Figure 1.

A first card 302 has been inserted into the transaction device 301 and this may be considered as the customer's card from which money tokens are to be debited. As shown in Figure 1, the transaction device also includes a second coupling means arranged to receive a second money smart card, such as card 102 as shown in Figure 1. However, in addition to being arranged to selectively couple with a second card, the second coupling means is also arranged to couple with an emulating device 303. As far as the transaction device is concerned the emulating device behaves in a very similar way to an actual money card but, as shown in Figure 3, the emulating device is actually connected to a networked computer 304 via a suitable interface cable, such as an RS 232 serial interface link 305. Thus, software instructions can be executed on the computer 304 of a form substantially equivalent to those executable by computer 201 in the previous system identified in Figure 2. In this way, it is possible for transactions to be made using the transaction device 301, without requiring an additional card reader/writer such as device 204. Transaction device 301 is different from device 208 in that it is arranged to detect the presence of an emulating device as distinct from another smart card. In this way, it is possible for a transaction device 301 to be more involved with the transaction taking place, such that the transaction device 301 may prompt a user before transactions are actually performed.

Operations performed by the transaction device 301 are illustrated in figure 4. At step 401 a question is asked as to whether an emulator has been inserted within the transaction device. If the question is answered in the negative, to the effect that a normal card is present, a

normal transfer takes place at step 402, whereafter control is directed to step 404. Alternatively, if the question asked at step 401 is answered in the affirmative, to the effect that an emulator is present, control is directed to step 403, resulting in transfers being controlled under modified protocols. After transactions of this type have taken place, control is again directed to step 404. At step 404 a question is asked as to whether another transfer is required and when answered in the affirmative, control is returned to step 401.

## CLAIMS

1. Apparatus for transferring data between portable data storage devices and a network, comprising

5 first coupling means arranged to couple with a first portable storage device;

second coupling means arranged to selectively couple with either a second portable storage device or an emulating device, wherein said emulating device is connected to said network via a processing system;

10 means for detecting the presence of either a second portable storage device or an emulating device connected to said second coupling means; and

means for modifying transfer operations if an emulating device is detected as being connected to said second coupling means.

15 2. Apparatus according to Claim 1, wherein said first portable storage device is a smart card configured to store money tokens.

3. Apparatus according to Claim 1 or Claim 2, wherein said second portable storage device is a smart card configured to store money tokens.

20 4. Apparatus according to any of Claims 1 to 3, wherein said processing system is a personal computer and said network is the Internet.

5. Apparatus according to any of Claims 1 to 4, wherein said means for modifying transfer operations is arranged to prevent a transfer occurring if predetermined conditions are satisfied.

5 6. Apparatus according to Claim 5, wherein said means for modifying transfer operations is arranged to prevent a transfer occurring if said transfer amount exceeds a predetermined amount.

7. Apparatus according to Claim 5, wherein said means for modifying transfer operations is arranged to prevent a transfer occurring if the amount to be transferred is inconsistent with user commands or  
10 with other information displayed to a user.

8. A method of transferring data between data storage devices and a network, comprising steps of;

coupling an emulating device to an interface apparatus, wherein said interface apparatus includes a first coupling means arranged to  
15 couple with a first portable storage device and a second coupling means arranged to selectively couple with either a second portable storage device or with said emulating device;

detecting the presence of an emulating device connected to said second coupling means;

20 effecting a transfer of data via a processing system connected to said emulating device;

detecting the presence of said emulating device as being connected to said second coupling means as a replacement for a second portable storage device; and

modifying transfer operations in response to said detected emulating device.





Application No: GB 9521136.3  
Claims searched: 1 to 8

Examiner: John Donaldson  
Date of search: 31 October 1996

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G4M(MAA, MAW, MCF)

Int Cl (Ed.6): G06F 3/00, 3/06, 3/08; G06K 7/00, 7/01, 7/04, 7/06, 7/08, 7/10, 17/00

Other: Online:WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	US 5434395 (STORCK), see column 8, lines 55 to 68, column 12, lines 7 to 18, column 16, line 40 to column 17, line 52, column 18, lines 31 to 61	1 to 8

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

  
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